



Breakout 1 Report

Carbon Biogeochemistry Working Group

1/20/2016



Breakout 1 charge:

Discuss stakeholder input and capture synergies & ways to inform & leverage each other's efforts (1)

❑ Field measurements and remote sensing

1. Coordination of data collection

- FS/FIA data collection in interior AK: Would like to have some information about plot locations so we coordinate with remote sensing and in-situ data collection. Can G-LiHT transect info be shared? Would like to know with what uncertainty the locations will be specified. Invite FS to join remote sensing planning discussions.
- Would like to better understand FS/FIA soil measurements and extrapolation methods, given that samples are spread over various seasons (so soil organic carbon may not be measured fully at all sites depending on depth of thaw).
- BLM plots sampling veg and soils: is there any overlap between BLM & FS/FIA efforts? Any commonality in protocols?



Breakout 1 charge:

Discuss stakeholder input and capture synergies & ways to inform & leverage each other's efforts (2)

❑ **Field measurements and remote sensing, con't.**

2. Key knowledge gaps and needs

- Uniform and consistent in-situ data in general; develop a common protocol and a spatial sampling plan for anything we measure
- Carbon stocks: above-ground and soils
- Coordinated uncertainty analysis with FS/FIA given that several classes are ignored and soil carbon measured at variable times
- Permafrost properties: ALT, Water table depth, soil moisture
- Flux estimates to corroborate assessment that there are direct relationships between browning/greening and productivity
- Connection between C and N: can hyperspectral data be used for estimating veg N in the boreal & arctic zones
- In general, need systematic top-down vision and data gap analysis



Breakout 1 charge:

Discuss stakeholder input and capture synergies & ways to inform & leverage each other's efforts (3)

❑ Field measurements and remote sensing, con't.

3. Ways to fill primary data gaps & needs?

- Need participation from stakeholders in our working group so that we can co-plan field and RS activities
- Need to keep supporting, and to expand, flux towers; tall towers
- Need to form a data coordination working group to develop spatial sampling strategies for RS and in-situ data, based on, e.g., stratification analysis; should include method intercomparison in case of multiple approaches used for measuring the same quantity, then recommend one method (if possible) going forward

4. Airborne remote sensing priorities

- Multifrequency radar for Permafrost/active layer properties (soil moisture, active layer depth, water table, organic layer)
- Hyperspectral+lidar for above-ground veg properties
- Lidar for terrain mapping and coastal hydrology, also for surface deformation
- Airborne in-situ atmospheric measurements (e.g., Picarro) of CO, CO₂, H₂O, CH₄



Breakout 1 charge:

Discuss stakeholder input and capture synergies & ways to inform & leverage each other's efforts (4)

❑ Modeling Efforts

1. Suite of in-situ data for cal/val
 - Need project-wide standardization effort to collate the existing data; harmonize the data sets in the Cloud
2. Stakeholder data sets to inform/assess models?
 - FS/FIA; BLM; USGS DEM
3. How can models best inform management needs?
 - Need more input from stakeholders about what models outputs can be used in their management tools; currently don't have carbon modeling input from stakeholders
 - Models need to include processes that can be affected by management decisions (fire management, forest management)
 - AK Fire Science Consortium: Need validated land surface models that can assimilate remote sensing products such as surface soil moisture and fire fuel
4. Are there common interests / redundancies / complementarity?
 - Active layer information
 - Carbon inventories and stocks (above-ground and soils)
 - Snow depth, snow pack, and other phenological indicators (indigenous knowledge could be very helpful to establish baseline but things are changing fast)